Docket No.: 0229-0761P
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Akio MIYORI et al.

Application No.: 10/614,857

Confirmation No.: 008155

Filed: July 9, 2003

Art Unit: 2123

For: METHOD OF SIMULATING TIRE AND SNOW

Examiner: A. Pierre-Louis

APPEAL BRIEF

MS Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

As required under § 41.37(a), this brief is filed within two months of the Notice of Appeal filed in this case on December 26, 2006, and is in furtherance of said Notice of Appeal.

The fees required under § 41.20(b)(2) are dealt with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

This brief contains items under the following headings as required by 37 C.F.R. § 41.37 and M.P.E.P. § 1206:

I.	Real Party In Interest
II	Related Appeals and Interferences
III.	Status of Claims
IV.	Status of Amendments
V.	Summary of Claimed Subject Matter
VI.	Grounds of Rejection to be Reviewed on Appeal
VII.	Argument
VIII.	Claims
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I. REAL PARTY IN INTEREST

The real party in interest for this appeal is:

Sumitomo Rubber Industries, Ltd, the Assignee of this application.

II. RELATED APPEALS, INTERFERENCES, AND JUDICIAL PROCEEDINGS

There are no other appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

A. Total Number of Claims in Application

There are 8 claims pending in application.

B. Current Status of Claims

1. Claims canceled: none
2. Claims withdrawn from consideration but not canceled: none
3. Claims pending: 1-8
4. Claims allowed: none
5. Claims rejected: 1-8

C. Claims On Appeal

The claims on appeal are claims 1-8

IV. STATUS OF AMENDMENTS

Applicant did not file an Amendment After Final Rejection.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Independent claim 1 recites a method of simulating a tire on snow, described generally in the first paragraph on page 1 of the specification. The method comprises

a) making a model of the tire made up of numerically analyzable elements *(page 6, lines 10-15, elements 2a, 2b, 2c in Fig. 2)*,

b) making a model of the snow made up of numerically analyzable elements *(page 10, line 26, through page 11, line 27, elements 6b, 6c in Figs. 8 & 10)* being capable of presenting its volume change and mass density change caused by compression and being capable of maintaining a volume change and a mass density change after the compression is removed *(page 9, lines 17-27, Fig. 7)*,

c) setting of conditions for rolling the tire model and contacting the tire model with the snow model *(page 14, line 23, through page 15, line 8, Fig. 17)*;

d) computing of deformation of the tire model *(page 16,line 20, through page 17, line 25, Fig. 13)*; and

e) computing of deformation of the snow model *(page 17, line 26, through page 24, line 14, Figs. 14 & 19-23)*,

f) repeatedly carrying out steps c), d) and e) at minute time intervals *(page 2, lines 9-13)* to obtain at least one of the following data: a force produced on the tire model in the back and forth direction *(page 25, line 14, through page 26, line 9, Fig. 25)*; and mass density *(page 29, line 11, through page 30, line 24, Fig. 33)*, pressure *(page 30, lines 5-10)*, stress *(page 30, lines 23-28, Fig. 35)*, speed *(page 31, lines 11-27)* and contact force *(page 32, lines 1-11)* of the snow model, and

g) outputting said at least one of the data *(page 25, line 13, through page 26, line 9, page 28, line 10, through page 30, line 28, Figs. 25 & 28-35)*.

Independent claim 8 recites a method of simulating a tire on snow, described generally in the first paragraph on page 1 of the specification. The method comprises

a) making a model of the tire made up of numerically analyzable elements, *(page 6, lines 10-15, elements 2a, 2b, 2c in Fig. 2)*

b) making a model of the snow made up of numerically analyzable elements to have a voluminal hysteresis, wherein the voluminal hysteresis is such that, during increasing in a compressive force applied to the snow model, the volume of the compressive-force-applied part decreases in proportion to the increase in the compressive force, while increasing the mass density thereof, but, when the applied compressive force is decreased, the decreased volume does not fully turn back, and a part of the decreased volume corresponding to an elastic strain turns, so as to simulate a state of the snow deformed by the applied compressive force, *(page 9, line 21, through page 10, line 19, Fig. 7)*

c) setting of conditions for rolling the tire model and contacting the tire model with the snow model *(page 14, line 23, through page 15, line 8, Fig. 17)*;

d) computing of deformation of the tire model *(page 16,line 20, through page 17, line 25, Fig. 13)*; and

e) computing of deformation of the snow model *(page 17, line 26, through page 24, line 14, Figs. 14 & 19-23)*,

f) repeatedly carrying out steps c), d) and e) at minute time intervals *(page 2, lines 9-13)* to obtain at least one of the following data: a force produced on the tire model in the back and forth direction *(page 25, line 14, through page 26, line 9, Fig. 25)*; and mass density *(page 29, line 11, through page 30, line 24, Fig. 33)*, pressure *(page 30, lines 5-10)*, stress *(page 30, lines 23-28, Fig. 35)*, speed *(page 31, lines 11-27)* and contact force *(page 32, lines 1-11)* of the snow model, and

g) outputting said at least one of the data *(page 25, line 13, through page 26, line 9, page 28, line 10, through page 30, line 28, Figs. 25 & 28-35)*.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The sole ground of rejection to be reviewed on appeal is the rejection of claims 1-8 under 35 USC 102(e) as being anticipated by US 6430993 B1 (Seta).

VII. ARGUMENT

THE EXAMINER'S REJECTION OF CLAIMS 1 AND 8

On page 3 of the Final Rejection, referring to the requirements of independent claims 1 and 8, the Examiner characterizes Seta as teaching "the functional equivalence of a method of simulating a tire on snow." The Examiner finds, in the Abstract, steps 100 and 102 in Fig. 2 and column 3, line 54 through column 5, line 65, of Seta, a disclosure of "the steps of making a model of a tire made up of numerically analyzable elements." Continuing from page 3 to page 4 of the Final Rejection, the Examiner also finds, in the Abstract, Fig. 2 and column 1, line 6 through column 6, line 63, a disclosure of "making a model of the snow made up of numerically analyzable elements being capable of presenting its volume change and mass density change caused by compression and being capable of maintaining a volume change and mass density change after the compression has been removed." On page 4 of the Final Rejection, the Examiner, again broadly citing disclosures in Seta, finds a disclosure in that patent of other steps recited in Appellant's claims 1 and 8, such as "setting of conditions for rolling the tire model and contacting the tire model with the snow model," "computing of deformation of the tire model," "computing deformation of the snow model," etc.

APPELLANT'S INVENTION

By the novel method disclosed and claimed in this application a simulation of tire performance on a snowy road surface can be used to evaluate the performance of tires running in snow and thereby facilitate the development of tires at modest cost compared to methods of the prior art. In particular, the disclosed and claimed method makes use of a model of snow which comes in contact with a model of a tire, and in which the snow of the model undergoes deformation, i.e., a decrease in volume and an increase in density in response to compressive forces resulting from contact between the tire model and the snow model.

THE SETA PATENT

Seta discloses a method of assessing tire performance that makes use of a "fluid model" in which the *flow properties* of the fluid model in contact with a tire model are used to evaluate

the tire performance. Some of the fluid models make use of the coefficient of friction imparted to a road surface by snow or ice having flow properties. According to one scheme, for example, snow is treated as a kind of snow-water slush. None of the schemes for a fluid model disclosed by Seta treat snow as a substance that undergoes deformation that produces changes in volume and density of the simulated snow. None of the schemes disclosed by Seta simulate the state of snow that is gradually trodden down by the tire. Accordingly, the schemes disclosed by Seta are fundamentally different from the method disclosed in this application and cannot meet the requirements that are clearly stated in independent claims 1 and 8.

Appellant has carefully reviewed the disclosure in Seta. Since Seta employs a finite analysis technique that can be used for assessing tire performance on a snowy road surface, the disclosure in Seta can be fairly characterized as meeting the broad requirements of Appellant's claims for a method of simulating a tire on snow, including the making of a model of the tire made up of numerically analyzable elements. However, within the Seta patent there is no disclosure or suggestion of the use of a snow model in which the snow of the model exhibits a volume change and a mass density change in response to compression, much less a snow model in which the snow of the model can maintain a volume change and a mass density change after the compression is removed.

APPELLANT'S CRITIQUE OF THE REJECTION

In the Final Rejection, the Examiner broadly cites disclosures in Seta as meeting the requirements of Appellant's claims 1 and 8. Significantly, the Examiner does not specifically identify, for example, a disclosure in Seta of a snow model in which the snow of the model undergoes a volume change in response to compression exerted on the snow model. In the method disclosed by Seta, snow which may come in contact with a tire model is treated as a fluid; it does not undergo a deformation and does not undergo a change in volume and mass density is response to compression.

On pages 2-3 of the Final Rejection, the Examiner dismisses the Appellant's contention that Seta does not offer a disclosure that meets the snow model as recited in Appellant's claims, stating, "the Examiner respectfully disagrees" and cites ten drawing figures in Seta "along with

their description" ostensibly as support for this position. The Examiner adds, "The Examiner asserts that Seta models the tire model and road surface to includes a snow model and perform evaluation and/or simulation of the models to estimate performance and computes deformation of the models, again vaguely citing disclosure in Seta.

A proper rejection under 35 USC § 102 requires that a prior art reference disclose every feature of the claimed invention, either explicitly or inherently. In re Schreiber, 128 F.3d 1473, 1477, 44 USPQ2d 1429, 1431 (Fed. Cir. 1997) and Hazani v. Int'l Trade Comm'n, 126 F.3d 1473, 1477, 44 USPQ2d 1358, 1361 (Fed Cir. 1997). While it is possible that it is inherent in the operation of the prior art device that a particular element may operate as theorized by the Examiner, inherency may not be established by speculation, probabilities or possibilities. In re Oelrich, 666 F.2d 578, 581, 212 USPQ 323, 326 (CCPA 1981) and In re Rijckaert, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993). For reasons presented above, Appellant respectfully submits that Seta does not have disclosure that can meet the clearly recited requirements of claims 1 and 8. The Examiner's vague citations of disclosure in Seta, particularly when used in response to Appellant's challenges to the adequacy of the Seta disclosure vis-à-vis the requirements of the claims, do not fairly provide a basis for a rejection based on 35 USC § 102.

PATENTABILITY OF DEPENDENT CLAIMS

Claim 2

This claim recites an advantageous feature of the invention, described on pages 14-15 of the specification and illustrated in Fig. 17. Despite the Examiner's vague citations of disclosure in Seta, Appellant can find no disclosure in Seta suggestive of the method steps recited in this claim. For example, Appellant finds no mention whatsoever in Seta of torque applied to a tire.

Claim 3

This claim recites an advantageous feature of the invention, described on pages 26-27 and illustrated in Figs. 26 and 27. Despite the Examiner's vague citations of disclosure in Seta, Appellant is at a loss to find in Seta a disclosure that can, for example, meet the requirement for an elastic body. Again, Appellant finds no mention whatsoever in Seta of torque applied to a tire.

VIII. CLAIMS

A copy of the claims involved in the present appeal is attached hereto as Appendix A.

Dated: February 26, 2007

Respectfully submitted,

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APPENDIX A

Claims Involved in the Appeal of Application Serial No. 10/614,857

1. A method of simulating a tire on snow comprising

a) making a model of the tire made up of numerically analyzable elements,

b) making a model of the snow made up of numerically analyzable elements being capable of presenting its volume change and mass density change caused by compression and being capable of maintaining a volume change and a mass density change after the compression is removed,

c) setting of conditions for rolling the tire model and contacting the tire model with the snow model;

d) computing of deformation of the tire model; and

e) computing of deformation of the snow model,

f) repeatedly carrying out steps c), d) and e) at minute time intervals to obtain at least one of the following data: a force produced on the tire model in the back and forth direction; and mass density, pressure, stress, speed and contact force of the snow model, and

g) outputting said at least one of the data.

2. The method according to claim 1 or 8, wherein the method further comprises

defining the tire model as being rotatable around its rotational axis and being movable only in the vertical direction in relation to a coordinate system, and

defining the snow model as being immovable in relation to said coordinate system, and

said conditions including a torque applied to the tire.

3. The method according to claim 1 or 8, wherein the method further comprises

defining the snow model as being immovable in relation to a coordinate system,

defining the tire model as being rotatable around its rotational axis, and

defining a model of an elastic body of which one end is fixed in relation to the coordinate system and the other end is connected to the rotational axis, and

said conditions including a torque applied to the rotational axis of the tire.

4. The method according to claim 1 or 8, wherein the tire model is of a halved tire on one side of the tire equator.

5. The method according to claim 1 or 8, wherein said outputting includes outputting one of the data by visualizing the distribution thereof in gray scale or changing color.

6. The method according to claim 1 or 8, wherein said outputting includes outputting one of the data relating to the snow model by visualizing the distribution thereof in gray scale or changing color and overlapping a view of the snow model.

7. The method according to claim 1 or 8, which further comprises visualizing and outputting specific elements which have data included in a predetermined specific range.

8. A method of simulating a tire on snow comprising

a) making a model of the tire made up of numerically analyzable elements,

b) making a model of the snow made up of numerically analyzable elements to have a voluminal hysteresis, wherein the voluminal hysteresis is such that,

during increasing in a compressive force applied to the snow model, the volume of the compressive-force-applied part decreases in proportion to the increase in the compressive force, while increasing the mass density thereof, but,

when the applied compressive force is decreased, the decreased volume does not fully turn back, and a part of the decreased volume corresponding to an elastic strain turns, so as to simulate a state of the snow deformed by the applied compressive force,

c) setting of conditions for rolling the tire model and contacting the tire model with the snow model;

d) computing of deformation of the tire model; and

e) computing of deformation of the snow model,

f) repeatedly carrying out steps c), d) and e) at minute time intervals to obtain at least one of the following data: a force produced on the tire model in the back and forth direction; and mass density, pressure, stress, speed and contact force of the snow model, and

g) outputting said at least one of the data.

APPENDIX B

No evidence pursuant to §§ 1.130, 1.131, or 1.132 or entered by or relied upon by the examiner is being submitted.

APPENDIX C

No related proceedings are referenced in II. above, hence copies of decisions in related proceedings are not provided.